Danntech Process Instrumentation

Danntech

kilnStar Temperature Monitoring System

Price: Call for Pricing

The kilnStar Temperature Monitoring System has been developed out of our experience over the past eight years in the development and maintenance of a kiln temperature transmitter system. It provides a means for transmitting twelve "fixed-point" temperatures and one "roving" temperature measurement off the kiln.

The system consists of the Kiln Data Transmitter (KDT) which is mounted on the kiln inside the Kiln Transmitter Enclosure (KTE). This is then connected to the Kiln Data Receiver (KDR) situated inside the instrument or control room, by means of a pair of slip rings (a radio link can also be used).

Using a striker switch on the kiln, which closes (or opens) once per revolution, the speed and position of the kiln is calculated by the KDT. Using this information the various bed (zero point or bottom dead centre) temperatures can be obtained from the kiln using the 12 fixed-point thermocouples. A single roving thermocouple can be used to provide a continuous temperature output for the standard kiln temperature profile control used by the operators.

The fixed-point thermocouples are located along the length of the kiln with the roving thermocouple positions being opposite the fixed thermocouple locations. Only one roving thermocouple is connected at any time and it can be placed in any position along the kiln. The roving thermocouple has a much faster response and is used at regular intervals to determine the bed and gas temperatures. Due to the construction of the roving thermocouple it has a much shorter life and hence cannot be left installed permanently.

The system can be operated in several modes and in the simplest mode the KDT determines when the each thermocouple is at the bottom position (position zero) and transmits that thermocouple temperature to the Kiln Data Receiver (KDR). The KDR then latches that value and produces a 4-20 mA (or 1 to 5 V) output.

Each fixed-point temperature is transmitted sequentially as the kiln rotates. In between these fixed-point temperature transmissions the roving thermocouple temperature is transmitted - typically every 3 to 4 seconds while the kiln reaches the next fixed-point thermocouple transmission.

There is a plug-in point for the roving thermocouple directly opposite each of the fixed point thermocouples. Only one roving thermocouple is connected at any time its position is selected by the operator.

General System Specifications

-
End to end accuracy better than ±0.5% (±6ºC).
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"Off-line" calibration using a PC or Kiln Data Display to initiate self calibration of zero and full scale temperatures. The Accu-Cal On-Kiln Calibration System can also be used.
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Output 22 mA when an open thermocouple is detected and 2 mA when the thermocouple is shorted.

- When communications are not available for more than communications timeout period (set at say 20% more than the time for one kiln revolution) the outputs can be preset to any value.

- Up to 15 fixed thermocouple inputs, one roving thermocouple input (TC#16).

- Fixed thermocouple measurement positions to be specified by customer.

- All fixed thermocouples will be read and the respective outputs updated when the respective thermocouple is within a few degrees of the zero point or bottom dead centre.

- The roving thermocouple will be read continuously and updated every 3 to 4 seconds or as determined by the data transmission rate.

- Only one roving thermocouple may be connected to any of the roving thermocouple inputs at any time.

- Measurement update time of 1 to 2 seconds for up to 16 thermocouples.

- One striker switch for kiln speed sensing.

- Kiln rotation speed range 0.1 to 0.7 rpm with nominal speed 0.5 rpm.

- The kiln speed (and hence thermocouple locations) are calculated one each revolution.

Two basic operating conditions - Normal and Continuous:

<u>**Normal**</u> **:**

In the Normal condition the thermocouples are updated every few seconds as determined by the operating mode.

<u>**Continuous:**</u>

The Continuous condition occurs when the kiln speed drops below the minimum kiln speed or the striker switch remain closed for longer than the Position Switch State Timeout, all of the thermocouple temperature outputs are update continuously.

Fall-back operation using a standard temperature transmitter allowing for one roving thermocouple and 4-20 mA directly transmitted via the slip rings for emergencies. Relay outputs for operating condition indication at Kiln Data Receiver.

<u>**System Calibration**</u>

A PC or the Kiln Data Display can be used to do the calibration. The calibration software switches the KDT into slave mode and then each input can be calibrated. Using a portable calibrator, 0ºC is injected into TC#1 input and when the reading is stable this is latched using the calibrate zero command. 1350ºC is then injected and this value then latched using the calibrate full scale command. This is repeated for each thermocouple input. The Accu-Cal On-Kiln calibration system can also be used.

Vendor Information